Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Boiling Point Elevation

Directions:

1. Pour exactly 10 mL of each of the following solutions into a

test tube.

Solution 1 – 0.1 M NaCl

Solution 2 – 0.5 M NaCl

Solution 3 – 1.0 M NaCl

1. Place all of your test tubes in a 400 mL beaker filled ½ way with water.
2. Place the beaker with the test tubes on a hot plate and slowly heat. You should have your hot plate on its medium setting. Watch each test tube for the first sign of boiling. (Look for bubbles in the test tube). When the solution starts to boil take the temperature and record it on the data table.
3. After all solutions have begun boiling and you have recorded the temperatures. Dump out the test tubes and rinse them out.
4. Repeat this process with 4 new solutions:

Solution 1 – 0.1 M CaCl2

Solution 2 – 0.5 M CaCl2

Solution 3 – 1.0 M CaCl2

1. When you are done, be sure to clean up your area, rise out your test tubes, and unplug your hot plate.

Data Tables

|  |  |
| --- | --- |
| Solution | Boiling point |
| 0.1 M NaCl |  |
| 0.5 M NaCl |  |
| 1.0 M NaCl |  |

|  |  |
| --- | --- |
| Solution | Boiling point |
| 0.1 M CaCl2 |  |
| 0.5 M CaCl2 |  |
| 1.0 M CaCl2 |  |

Place the solutions in order based on when they started to boil. Rank the one that started to boil first, and the one that boiled last, rank last:

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
6. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Questions:

1. What does the M stand for in the description of each solution? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. What were the two solutes that were used in this lab? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. What solvent was used in this lab? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. Which concentration of NaCl boiled at the highest temperature? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. What concentration of CaCl2 boiled at the highest temperature? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
6. What concentration of NaCl boiled at the lowest temperature? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
7. What concentration of CaCl2 boiled at the lowest temperature? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
8. Describe the relationship between concentration and boiling point. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. At the same concentration, which salt solution, NaCl or MgCl2 boiled at the highest temperature? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. At the same concentration, which salt solution boiled at the lowest temperature? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Describe the relationship between the number of ions a solution has the boiling point. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Explain why some people add salt to the water when they are making noodles. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. How many moles of CaCl2 did I add to 1 liter of water in order to make a .1 molar solution?